



**IRS Office of the Chief Procurement Officer**

August 6th, 2020

# Predicting Contract Award Date

Using Machine Learning to Predict Award  
Date for Open Procurement Contracts



# Predicting Contract Award Date

**The government contracting process is quite complex and varies greatly on a case-to-case basis**

- **Many qualitative and quantitative factors determine how long it takes to award a contract**
- **Difficult for even the most experienced contracting officers to make predictions on when a contract will be awarded**



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**Enter the Magic of Machine Learning**





# Why Machine Learning?

**Although machine learning may seem like wizardry, it isn't**

- **Machine learning is applying a mathematical model “trained” on labeled data to make predictions on how to label new unlabeled data**
- **Similar use cases include identifying spam emails and recommending movies for you to watch**

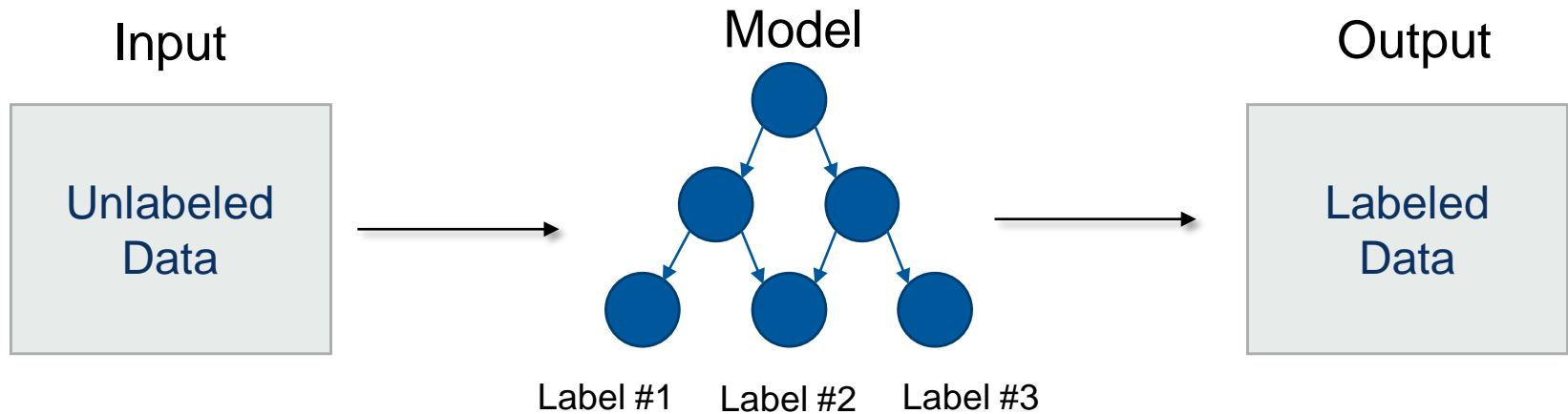
**Using data on contracts that have already been awarded, we can train a machine learning model to predict the award date of open contracts**

**This will allow procurement professionals to make better timeline and budget projections for vendors and executives**



# Projected Award Date Model

**Machine Learning models take in unlabeled data and, using the patterns and observations it “learns” from labeled training data, makes predictions on how the unlabeled data should be labeled**



**In our case, our model learns from the data on contracts that have already been awarded to predict when future contracts will be awarded**



# Model Input and Useful Features

## **Model is optimized to predict on shopping carts that**

- Have been approved and assigned to a contracting specialist
- Have a value greater than \$0
- Are not deobligation actions

## **Important factors in determining contract award date**

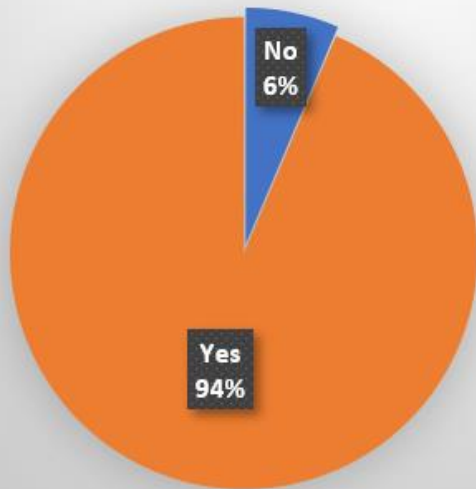
- Current workload of the Contracting Specialist
- Date of Approval
- # of days until FY end



# Model Performance on Test Set

**\*Performance evaluated on sample of data over past FY**

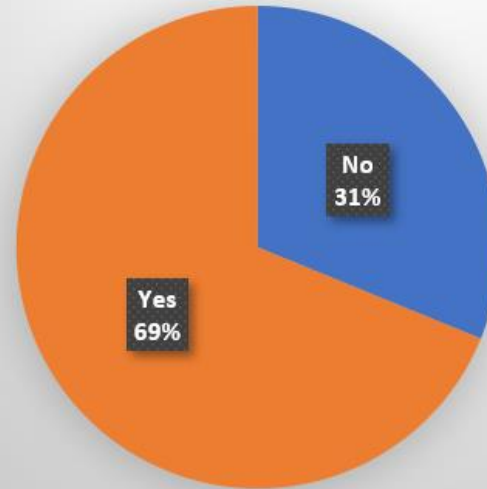
## Prediction within +/- 30 Days



Within +/- 30 Days

No Yes

## Prediction within Award Month



Within Same Month

No Yes



# Appendix

## Summer Itinerary

- Learning the R Programming Language (1 week)
- Exploring, updating, and cleaning Treasury USASpending Data (1 week)
- Learning Tableau & creating dashboards to better understand Zero Dollar Contract Awards (2 weeks)
- Machine learning modeling to predict contract award date (6 weeks)

## Resources

- R Tutorial: <https://r4ds.had.co.nz/>
- USASpending: <https://www.usaspending.gov/>





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